AUSTRIA.—The Austrian Government has for a number of years been accustomed to bestow liberal grants to the more promising students in the universities, under the condition that the recipients shall make use of them to undertake a course of study in the German universities. The results of this plan seem to be satisfactory, for we notice that this winter an unusually large number of students in all branches have been sent to the various universities in Germany.

A BERLIN POLYTECHNIC.—Berlin, with all her numerous educational establishments, has lacked hitherto a polytechnic such as is to be found in most of the German industrial centres at the present day. This want will soon be repaired, a commission having completed the plans for an extensive institution which will embrace nearly every branch of technical education. The plans for the necessary buildings have already been prepared, and as there is but little doubt that the Prussian Chamber of Deputies will grant the 9,300,000 marks required, the work of erection will commence next spring. On account of the extensive character of the proposed edifices, five years will be required for completion.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, December 13.—C. W. Merrifield, F.R.S., vice-president, in the chair.—The Rev. W. Ellis was elected a member.—Mr. S. Roberts read a paper on normals, which contained theorems depending on the invariants and covariants of the quartic equation representing a pencil of four normals to a conic, and drew attention to the remarkable cubic locus of the points of possible concurrence of these normals at the vertices of a given inscribed triangle.—Dr. Hirst and Mr. J. J. Walker spoke on the subject. Prof. Cayley, F.R.S., read a paper on "the geometrical representation of imaginary quantities and the real (n, n) correspondence of two planes."

Linnean Society, November 15.—Dr. Gwyn Jeffreys, F.R.S., vice-president, in the chair.—Mr. J. Jenner Weir exhibited a case of Alpine butterflies, interesting for their similarity to, though not specifically identical with, those obtained by the naturalists of the Polar Expedition.—Three papers on the Arctic fauna followed. I. Report on the Insecta including Arachnida, collected by Capt. Feilden and Mr. Hart during the recent Arctic expedition, by R. McLachlan. It seems there were obtained of Hymenoptera 5, Coleoptera 1, Lepidoptera 13, Diptera 15, Hemiptera 1, Mallophaga 7, Collembola 3, Araneida 6, and of Acarida 6 species, namely, a total of 57 species. Bearing in mind these are from localities between 78° and 83° N. lat., that among them are thirty-five specimens of gaily-coloured butterflies and two species of humble-bees, and it becomes evident the insect-fauna of this so-called "land of desolation" is, after all, not so meagre as anticipated. The paucity of beetles and abundance of butterflies are each striking features. From variations in certain well-known species obtained, Mr. McLachlan suspects they represent a local fauna, and he regards the latter as having affinity to the Lapland fauna, inclining to think both are but lingering remnants of a once former and extensive circumpolar fauna.—II. Preliminary notice on the surface fauna of the Arctic Seas as observed in the recent Arctic expedition, by Dr. Edw. L. Moss (late surgeon, H.M.S. *Alert*). The author observes that the seas north of the Greenland settlements are subject to such varying conditions at different seasons of the year that their surface-fauna cannot be supposed to be very constant. Nevertheless, judging from what fell under his observation during the voyage, he divides the watery area into three zoological regions: (*a*) A district in the latitude of Melville Bay, temporarily monopolised by infusoria, *Peridinea*: (*b*) a north-water region inhabited by Pteropods, Tunicates, and Hydrozoa; and (*c*) a sub-glacial region comparatively lifeless, so far as sea-surface implies.—III. On the annelids of the British North Polar Expedition (1875-76), by Dr. W. C. McIntosh. This collection, dredged between 70° and 82° N., was not so rich in numbers or species as that procured by the storeship *Valorous* in Davis Straits, but some eight species were got which were not among the latter's collection. None are new, but notwithstanding they help to render clear some points in the geographical distribution of the marine worms, so far as the circumpolar area is concerned.—Dr. H. Trimen exhibited specimens of the Olibanum, or Frankincense tree (*Boswellia carterii*, Birdw.), gathered by Mr. J. Collins from the trees planted at Aden. Dr. Trimen, in making some remarks on the variability of the foliage of the species of *Boswellia*, expressed the opinion that *B. Bhau-Dajiana*, Birdw., was not specifically separable from *B. Carterii*. *B. Frereana*, which yields the fragrant resin called "Luban Metyi," and which Hanbury considered to be the African "Elemi," is much chewed by Orientals, but rarely imported into England. It is found in the Somali land, where Hildebrandt recently collected it.—The following gentlemen were elected Fellows of the Society: Mr. W. S. Lawson, Mr. W. Joshua, and the Rev. M. A. Macthert.

Geological Society, December 5.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—Dr. Isaac Bayley Balfour, David Burns, Samuel Cooke, Henry Drummond, Sandford Fleming, Rev. John Hodgson, William Etheldred Jennings, Henry Merryweather, Robert Robinson, Martin Stewart, George Eastlake Thoms, Robert F. Tomes, and Irwine J. Whitty, were elected Fellows of the Society.—A portrait of Mr. J. Evans, D.C.L., F.R.S., V.P.G.S., was presented by the President.—The following communications were read:—On the building-up of the White Sinter Terraces of Roto-Mahana, New Zealand, by the Rev. Richard Abbay, M.A., F.G.S.—Additional notes on the Dimetian and Pebidian Rocks of Pembrokeshire, by Henry Hicks, F.G.S. The additional facts communicated by the author show that at a distance of about ten miles to the east of the Dimetian axis of St. David's there is another ridge of these rocks, which also runs nearly parallel with it. This is also flanked by Pebidian and Cambrian rocks, and made up of rocks like those in the St. David's axis. The Dimetian formation, so far as it is at present known, consists chiefly of the following rocks:—1. Quartz porphyries, containing frequently perfect quartz crystals (double pyramids), subangular masses of quartz, and crystals of felspar in a felspathic matrix. 2. Fine-grained greyish quartz-rocks, very compact, and interstratified with the above. 3. Ashy-looking shales of a dull green colour, sometimes highly indurated, but usually showing lines of lamination. Microscopically these show basaltic characters, and are probably greatly altered interbedded basaltic lavas. 4. Compact granitic-looking rocks. 5. Quartziferous breccias. 6. A series of compact quartzites and crystalline schists, interstratified by green and purple altered basaltic lavas, with a slaty and schistose foliation, and by some dolomitic bands. Of the *Pebidian* formation new areas were added, and the portions described in the author's previous paper were further extended, and details as to the chief mineralogical characters added. At the base of the series resting unconformably on the Dimetian is seen an agglomerate composed of large angular masses of a spherulitic felstone, pieces of quartz and quartzites, indurated shales, crystalline schists, &c., cemented together by a sea-green matrix of felstone. These are followed by conglomerates of the same materials, which are again succeeded by indurated shales, often highly porcellanitic in character, with a conchoidal fracture. These are followed by a thick series of silvery white and purplish shales and green slates, alternating with fine and rough ashes, often conglomeritic, hornstone breccias, felstone lavas, &c. The series, as exhibited at St. David's, has a thickness of over 8,000 feet; and as it is everywhere, so far as yet seen, overlapped unconformably by the Cambrians, it may probably be of much greater thickness. It evidently consists very largely of volcanic materials, at first derived from subaërial, but afterwards from submarine, volcanoes. These materials, however, were also undoubtedly considerably aided by sediments of a detrital origin. The whole series shows that the sediments have undergone considerable changes, but yet not sufficient to obliterate the original characters, and the lines of lamination and bedding are usually very distinct. That they were altered nearly into their present state before the Cambrian sediments were deposited upon them, is clear from the fact that the pebbles of the Cambrian conglomerates which rest immediately on any portion of the series are almost invariably made up of masses of the rocks below, cemented by gritty materials on an unaltered matrix, and from which the pebbles may be easily removed. The great conglomerates at the base of the Cambrians, everywhere in Wales, indicate that there were beach- and shallow-water conditions over those areas at the time, and that the sea was then encroaching on an uneven land, becoming gradually depressed to receive the subsequent Cambrian sediment.—On some pre-Cambrian (Dimetian and Pebidian) rocks in Caernarvonshire, by Henry Hicks, F.G.S. In this paper the author gave an account of the special examination of the great ribs of so-called intrusive felspathic and quartz porphyries which are found associated with the Cambrian rocks in Caernarvonshire, made by him in company with Prof. Hughes,

Mr. Hudleston, and Mr. Homfray last summer.—On the pre-Cambrian rocks of Bangor, by Prof. T. McKenny Hughes, F.G.S. The author described a series of slates, agglomerates, and porphyritic rocks which, near Bangor, are seen to pass under the Cambrian and seem to rest conformably upon the quartz felsites and granitoid rocks of Caernarvon. He considered that in the main the Bangor beds were the equivalents of the Pebidian of Dr. Hicks, while the Caernarvon beds nearly represented his Dimetian. But he thought there was as yet no proof of an unconformity between these formations.—An appendix by Prof. Bonney, on the microscopical examination of the rocks referred to, accompanied this paper.

Royal Microscopical Society, December 5.—Mr. H. C. Sorby, president, in the chair.—The president announced that in consequence of the death of Dr. Lawson it had become necessary to reconsider the subject of publication, and the Council had, after careful attention to the matter, decided in future to publish their own proceedings.—A paper by Herr Zeiss on Abbé's apertometer was read by Mr. Ingpen, who exhibited the apparatus to the meeting and further explained its construction and method of application by means of black-board diagrams. Mr. Ingpen also described the method of measuring angular apertures last adopted by Mr. F. H. Wenham.—A paper by Mr. F. A. Bedwell on *Cephalosyphon* was read by Mr. Slack, who afterwards explained the structure of this rotifer, and pointed out the special features to which attention was drawn by the author of the paper.—Another paper by the same author on a new method of examining *Actinia mesembryanthemum*, was read by Mr. Chas. Stewart; it was illustrated by drawings, some of which were enlarged upon the black-board.

Institution of Civil Engineers, December 11.—Mr. George Robert Stephenson, president, in the chair.—A description of Cofferdams used at Dublin, Birkenhead, and Hull, by Mr. William James Doherty, Assoc. Inst. C.E., was read.

GÖTTINGEN

Royal Academy of Sciences, August 24.—The division of a language into several different languages, by M. Benfery.—On the earthquake of Iquique on May 9, 1877, and the tidal movements thereby produced in the ocean, by M. Geinitz.

November 7.—Report on the Physical Institute (department of experimental physics), from 1871 to 1877, by M. Riecke.

November 14.—D instead of N, by M. Benfery.—Contributions to physiography of rock-forming minerals, by M. Lang.

November 21.—Antiquities in the south-west of Switzerland, and in Turin, by M. Wieseler.—On the secondary intestine of the echinoideæ, by M. Ludwig.—Obituary notices of M. Hartmann and M. Marx.

PARIS

Academy of Sciences, December 10.—M. Peligot in the chair:—The following papers were read:—On some applications of elliptical functions (continued), by M. Hermite.—On invariants, by Prof. Sylvester.—On the arrangements which, in the system of a navigation sluice with single oscillation, conduce to the maximum of production and the minimum of expense of construction, by M. De Caligny.—On the development of eggs of the phylloxera of the oak, and the phylloxera of the vine, by M. Boiteau.—M. Volpicelli sent a note tending to prove, by means of potential, that induced electricity of the first species has no tension.—Application of Leyden jars of large surface for distributing, at various points, the effect of the current from a single source of electricity, with strengthening of the effect, by M. Jablochkoff. Connecting one surface of such an apparatus (called in this case an *exciter*) with one of the conductors of a machine which gives alternate currents, an alternating current is got by the other surface of the exciter and the second conductor (or the earth), more powerful than the current given directly by the machine. If a series of exciters with surfaces of nearly 500 square metres be thus connected with a machine which gives a spark equivalent to that of six or eight Bunsen elements, a voltaic arc of 15 to 20 mm. is obtained, and carbons of 5 mm. diameter are reddened to an extent of 6 to 10 mm. from their extremity. Such effects are utilised in electric lighting.—On the law of absorption of radiations through bodies, and its employment in quantitative spectrum analysis (continued), by M. Govi. He shows how *surfaces of chromatic absorption* may be obtained by means of the analysing photometer, measuring the various simple radiations which take part in a complex radiation.—On some properties of chloride of calcium, by M. Ditte. He deals with the calorific phenomena accompanying the reaction of water with this chloride. If the latter be anhydrous, a heating is observed, and fresh additions of water cause successive heatings; but if the chloride be hydrated, its mixture with water produces at first a considerable cooling followed by heating if some more of the solvent be added.—Application of palladium wire to determination of the hydrocarbons mixed in a small proportion with air, by M. Coquillion. It is necessary to operate with a cherry-red, near white-red. The results agreed with theory.—On the development of the functions of M. Weierstrass according to the increasing powers of the variable, by M. André.—On the lesions of the nervous system in diphtheritic paralysis, by M. Dejerine. There is an atrophy of the anterior roots, which follows destruction of the cells of the anterior horns of the spinal cord, by a process similar to that of myelitis.—Orography, by M. Schrader. The author presented a geographical map of Mont Perdu, made with his orograph, which consists of a circular paper-covered plate with central vertical axis carrying a sleeve which can turn round freely. On the top of the sleeve is a telescope, the movements of whose frame in the vertical direction are communicated to a pencil, and transformed by gearing into to and fro movements. If the telescope describes a circle round the horizon, the style describes a corresponding circle on the plate; if the telescope goes up or down, the trace produced is further from or nearer to the central axis. A spirit level being fixed to the telescope, the circle made when it is even, gives a means of estimating the heights and depressions.—On the folding of the lacustrian strata of Auvergne in Central Limagne, and its consequences, by M. Olivier.—Influence of soil and forests on climate; temperatures of air layers over woods; consequences as regards vegetation; effects of currents arising from differences of temperature under wood and beyond wood, by M. Fautrat. The frigorific action of the forest is very manifest in the hot season. Under pines in September the temperature is lowered 1·60°. Pure sand raises the temperature of a place. Leafy woods, during vegetation, produce a slight lowering of temperature in the atmosphere above. Above pines, in the daytime, there is always a rise of temperature, from the solar heat being retained by the vapours enveloping the tree-tops. From the differences of temperature within and without woods, a current arises in the wood from below upwards, and round the woods course lateral currents from the wood to the plain.—On the disinfecting properties of cellulosic substances carbonised by concentrated sulphuric acid, by M. Garcin.

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